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### Slow Lightning.



FIG. 1.

width of the moon. Fig. 2 reproduces a photograph of electric sparks from an "influence machine," and shows the jumping of the discharge from particle to particle of dust in the air, like a person crossing a brook on stepping-stones. It helps to explain certain rare kinds of lightning flash of a more or less zigzag form dotted with bright points.

### A Whistling Snake.

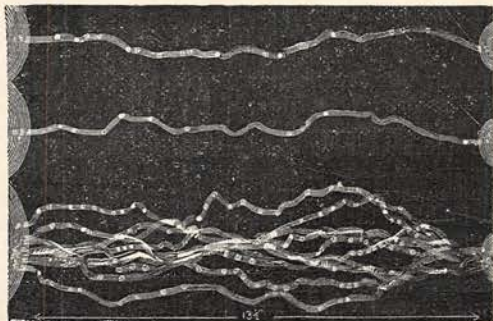
Sir William Macgregor has drawn attention to a small black and deadly snake of New Guinea which can whistle like a bird, and he mentions that a boy was recently bitten to death through mistaking one for a cockatoo in the bushes. The account reminds us of the "whistling" or rather fiddling spider of the Macdonnell range in Australia, which emits a musical note by drawing its leg across its jaw, and of the new African snake described by a French explorer, which has the gift of squirting an irritating juice on its enemies—a talent not confined to serpents, and, in a metaphorical sense at least, occasionally developed in human beings

### Drying Flowers.

A German chemist has found a way of preserving the colours of dried flowers, even of delicate poppies. Flowers lose their tints in drying through ammonia in the air. The inventor presses his specimens between sheets of paper which have previously been saturated with a solution of 1 per cent. of oxalic acid in water.

### Photographing Meteorites.

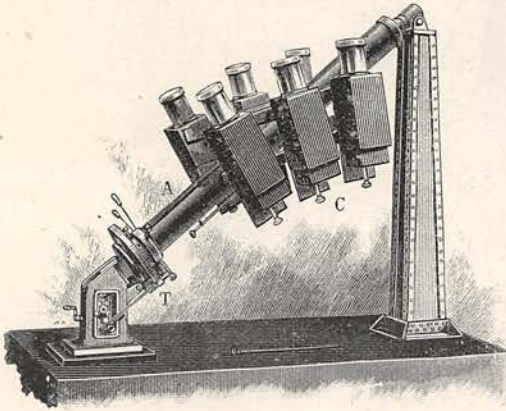
The photographic plate, being more sensitive to light than the retina of the human eye, has been instrumental in discovering stars and asteroids or tiny planets, and it has recently been used for the radiant points and fiery tracks of meteorites—those wandering stones which are streaming through space, and fusing by the friction of the air while falling towards the earth. It is well known that a large number of these interstellar missiles, which we may call the leavings of creation, are attracted by our planet, but few of them reach the ground, luckily for us and our works. The great majority are melted by the heat of friction with the atmosphere before they come near the surface of the ground, and appear to the eye as falling or shooting stars. Their importance from an astronomical point of view lies in the probability of their helping



SLOW LIGHTNING.—FIG. 2.



to build up planets, and also of supplying fresh fuel to the sun. The mere impact of a shower of meteorites is, of course, transformable into heat in the same way as a hammer heats the anvil which it strikes. The apparatus shown in our engraving



PHOTOGRAPHING METEORITES.

is employed at the Yale Observatory, United States, to observe these capricious bodies, and was designed by Messrs. Warner and Swazey. It consists of a polar axis, A, about 12 feet long, supported on bearings and driven by a clockwork, T, which causes it to move with the heavens, so that the stars appear on the photographic plates of the attached cameras, C, as points of light. Were the cameras stationary, the stars would show as lines of light. The radiant points and luminous trails of the meteorites are thus easily recognised on the photograph, and their paths measured with respect to the stars. The six cameras are so directed as to cover a large portion of the night sky, and the clockwork is controlled by electricity.

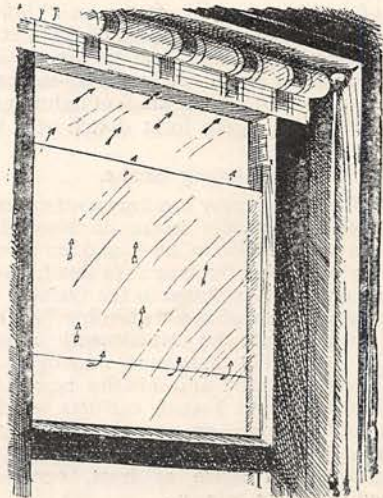
#### What is Gravity?

Not so long ago it was believed by most people that the attraction of gravitation—the force which holds the solar system and other parts of the visible universe together—was an “action at a distance,” that is to say, the force acted through empty space between the two bodies which were held together, without any intervening mechanism. The great Newton, who discovered the law of gravitation, did not believe in “action at a distance,” though he could not understand the mechanism of gravity. Since the discovery of the luminiferous ether by which waves of light are conveyed from one luminous body to another, and waves of electro-magnetism from one electric body to another, the conviction has been gaining ground that gravity is also due to a fine molecular substance, an ether, or something else. Le Sage was the first to give a mechanical explanation of gravity. He imagined that streams of very minute atoms or “corpuscles” came from beyond the limits of the universe, and in passing through it pressed the molecules of gross matter together. Two bodies, by sheltering each other from the streams of corpuscles, were inevitably forced towards each other, and he formulated certain conditions which the corpuscles had to fulfil in order to account for all we know of gravity. His

hypothesis was recently modified by Lord Kelvin, and there is little to say against it except that it necessitates a constant supply of the corpuscles coming from nobody knows where, and going nobody knows whither. Within the last few years, however, a new theory has grown out of it, which does not ask for a perpetual influx of corpuscles from the Infinite. The author, Dr. S. Tolver Preston, who has been honoured by the University of Munich for his work on the subject, only requires the existence of a “gravity-gas,” that is to say, a gas consisting of inconceivably minute particles or atoms, constantly colliding amongst each other in place of Le Sage’s streams of corpuscles. This gas permeates gross matter in all directions, and its atoms are so small that each traverses a space many times greater than the distance through which gravity acts before it collides with another. Such a gas would act on the molecules of ordinary matter steeped in it and tend to press them together, like gravity. If this be the right explanation of the mystery it will follow that gravity does not necessarily act throughout the universe, as is popularly supposed, and taught in many of our scientific books, but only through spaces of less extent than the average “free path” of the gravity atoms; that is to say, the mean distance which they travel without collision. The solar system, for example, may fall within this distance, and indeed its extent may be fixed, or limited by this condition, while the stars may not gravitate to the solar system at all. The stability of the universe, in fact, would be ensured without supposing the mutual attraction of all its different parts.

#### Ventilating Panes.

Our engraving shows a new kind of ventilator introduced by a French army surgeon, and fitted into the French barracks, at the tops of the windows. As will be seen from the arrows, the fresh air passes up between two parallel panes of glass and escapes into the room at the top of the inner one. The device allows of continual renovation of the air of a chamber without injurious draughts.



VENTILATING PANES.



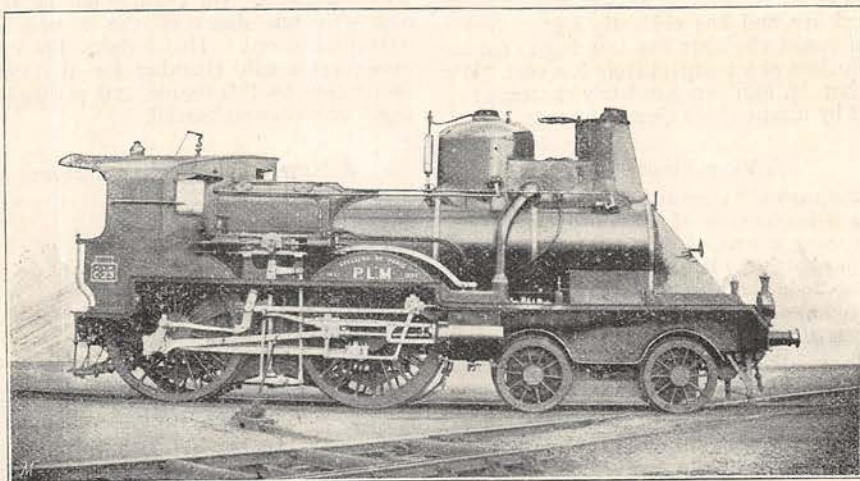
### The Mind in Childhood.

Dr. Sully, the well-known psychologist, has been writing on the development of the mind in childhood, and more especially on the tendency of children to personify inanimate objects, as most savages do, and on what he calls the age of questioning, which begins after they have learned to speak. He cites instances of children who believed that stones could feel and see just as they could, and in the kindness of their hearts would shift the stones to give them a change of scene. The first questions asked by a child usually relate to the "What," and betray a desire for information as to what the thing is; but as it grows older the child asks what it is good for, where it has come from, and other questions relating to the how and why. For

with pigments and gold dust, or mother-of-pearl powder. About twenty different kinds are sold, of various colours—black, vermilion red, azure blue, and so on. The lacquer is applied with brushes of stiff bristles enclosed in wood like the graphite of lead-pencils, and sharpened in the same way. It is unaffected by acids, bears a high temperature, and does not fade with time.

### A Beak Locomotive.

Stephenson, the great railway engineer, proposed to break the force of the wind on locomotives by fitting prows, or guards, to them, but it is only of late that his idea has been carried out in America and France. Our illustration shows one of the new "beak" locomotives of the Paris-Lyons-Medi-



A BEAK LOCOMOTIVE.

example, the late Clerk Maxwell, the famous electrician, as a child habitually asked his elders what was the "go" of and the "particular go" of a thing. Other children have been known to ask where the "wind went to"; how the first hen came into existence before there were any eggs; could they be upstairs and not upstairs at the same time, and so on. One little girl remarked to her father who was trying to explain how difficult it was to create something out of nothing, "Perhaps the world's a fancy." Such questions, in the opinion of Dr. Sully, tend to reveal a certain law or progress of development in the mind of a child and are not to be discouraged by adults, though occasionally checked, but rather to be received with sympathetic attention, and judiciously answered with sincerity.

### Japanese Lacquer.

This famous lacquer comes from the urushi-naki (*Rhus vernicifera*), a tree about thirty feet high and forty inches in girth. The gum is most plentiful in the sixteenth year of the tree, and is drawn from the trunk by making horizontal cuts in summer. The milky juice thus obtained turns brown on exposure to the air, and, after being filtered, is bleached in the sun. It is coloured

terrean Railway, from which it will be seen that the front of the engine and tender are "beaked" with iron plates meeting at an angle of  $45^\circ$ . The improvement diminishes the resistance of steam by a half, and effects a saving of about 10 per cent. in the fuel consumed. There seems no good reason why this economical device should not be applied to bicycles and road vehicles of speed, and aluminium is marked out for the purpose owing to its lightness.

### An Electric Life-buoy.

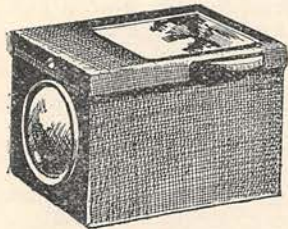
The value of a light attached to a buoy flung into the sea to save a life has been well proved by the Holmes chemical torch, which ignites when the water reaches the composition. A German electrician has recently brought out a new buoy lighted by an electric lamp of sixteen candle power enclosed in bull's-eye lenses and protected by a cage of wire. The current is supplied by an accumulator of the "solid" or celluloid type forming part of the buoy, and charged so as to maintain the light for no fewer than six hours. As the light can be seen for 2,000 yards in any direction the buoy will be a useful aid at sea. It weighs 112 lbs. and the lamp is automatically lighted in the act of unshipping it.



### Aluminium in the Kitchen.

Pots, pans, milk-boilers, and other cooking utensils are now made of aluminium, which is both light, cleanly, and durable. It is also free from poison, and requires no tinning or enamelling within or without.

Further, it cooks more quickly than iron, as it retains the heat better. Portable canteens, basins, cups, plates, salt-cellars, trays, toast racks, and what not are also made of this white and shining metal, which is coming rapidly into general use, and has evidently a great future before it now that chemists are learning to reduce it from its oxides at a comparatively low cost. We may add that M. Moissan has lately succeeded in reducing it by means of his electric furnace.



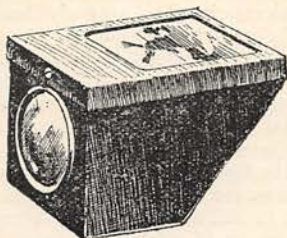
A VIEW FINDER.—FIG. 1.

### A View Finder.

The photographic "view-finder" which we illustrate gives a bright view of the object and comprises the same extent of picture as will appear on the photographic plate. The form shown in Fig. 1 is intended for fitting into field and hand-cameras, and has a revolving wheel on the top which can be turned for either vertical or horizontal pictures, while Fig. 2 shows a smaller form designed for insertion in hand-cameras.

### A Luminous Egg.

Professor Dewar makes a pretty experiment by exposing an ordinary egg to the light and then cooling it with liquefied air to a temperature of 180 deg. Centigrade below the freezing point. The egg is seen to shine as a globe of blue light. A feather is also rendered luminous in a dark room by the same treatment. So are cotton wool, paper, leather, linen, sponge, tortoise-shell, and a white flower of the Dianthus. Celluloid, paraffin, ivory, horn, indiarubber, after being excited by the magnesium light, then cooled to the above low temperature, emit a greenish or bluish light. Impure water, alcohol, glycerine, and colourless salts also exhibit phosphorescence under this treatment. Coloured glasses and paper do not. Milk is more phosphorescent than water, white of egg more than yolk, and in general white substances more than coloured. Metals—owing perhaps to organic matter on them—also phosphoresce, a fact which, we may add, seems to explain the phosphorescent pistol observed by Dr. Kane in the Arctic regions. Certain photographic plates, such as Eastman's, are still sensitive at these low temperatures, when ordinary chemical action fails. "Luminous paint" made



A VIEW FINDER.—FIG. 2.

of sulphide of calcium loses its phosphorescence at 80 deg. C. below zero. Professor Dewar's results would seem to account for the luminosity or "ash light" seen on the moon when it is totally eclipsed by the shadow of the earth, and partially at least for the phenomenon of the "old moon in the new one's arms," which is generally ascribed to "earth-shine," that is, the sunlight reflected from the earth to the dark portion of the moon.—While upon this subject we may mention that M. Pictet, another distinguished worker in the field of low temperature, has found a remedy for indigestion and loss of appetite in extreme cold. He observed that dogs confined in a cell refrigerated with liquid air became ravenously hungry, and, being afflicted with a chronic indigestion, tried the cold air bath himself, well wrapped up in blankets. On coming out he felt hungry, and after ten doses of the remedy found his dyspepsia cured. He declares his intention of fitting up a cold chamber for the treatment of indigestion by this means, and perhaps in certain cases he will be successful.

### A New Safety Lamp for Home Use.

A new safety lamp and burner, not inaptly called the "Perfect," have recently been patented, and are now procurable by the general public.

Fig. 1 shows a lamp in which the new burner is applied to a duplex light. As will be seen in the section given in Fig. 2, the two burning wicks are carried in metal tubes which terminate in each case in a metal cap or trough. The tubes are just long enough to fit closely against the bottom of the oil reservoir, with the result that the burning wick does not come into contact with the oil in the reservoir. How,

then, is it fed? Alongside the bottom of each of the wick tubes is a second and shorter tube, through which a second wick is conducted to the cap-reservoir, and carries oil to it siphon-wise. So much for the burner, the construction of which plays an important part in the action of the safety lamp. The larger illustration (Fig. 2) shows the automatic extinguisher which is brought into play if the lamp is upset. To the free arm of a lever extinguisher is attached a brass chain which is carried in a tube of narrow bore through the oil reservoir, and holds at its lower end a heavy ball of lead. This ball rests upon a socket in the centre of the lamp below the



FIG. 1.



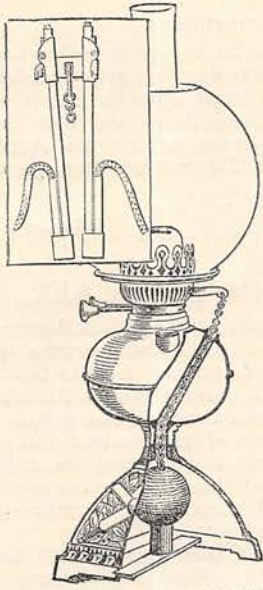


FIG. 2.—SECTION OF LAMP AND BURNER.

burner; and if displaced, as it inevitably is as soon as the lamp is inclined to any serious extent from the perpendicular, by its own weight brings the extinguisher into action and puts out the light. Lamps of every shape and size can be had with this safety attachment; and some small hand lamps are made which require no glass, and, being fitted with the safety-burner, can be used with security like a candle or night-light.

**A Useful Work of Reference.**

With the eighth volume, which is now published, and carries on the references from "Rubiaceae" to "Zymotic," "Cassell's Storehouse of General Information" is completed, and presents a cyclo-pædia which is a marvel of conciseness. The volumes are handy in size and are freely illustrated, and every subject which is at all likely to be in general demand will be found fully treated.

**A Gasoline Bicycle.**

The little bicycle which we illustrate will supply a felt want, inasmuch as it can go by itself by means of a gasoline motor concealed inside. We need not occupy the time of the reader with a detailed description of the mechanism out of sight, but may mention that the gasoline is contained in a metal reservoir, and the vapour ignited by a lamp so as to explode in the cylinder and work the piston backwards and forwards. The piston turns the rear or driving wheel of the bicycle round, and the whole machine is moved forward or backward as the case may be. The rider has only to start, stop, and steer, or regulate the speed. The new bicycle is coming rapidly into favour all over the Continent.—While upon this subject we may add that a cellular tyre for

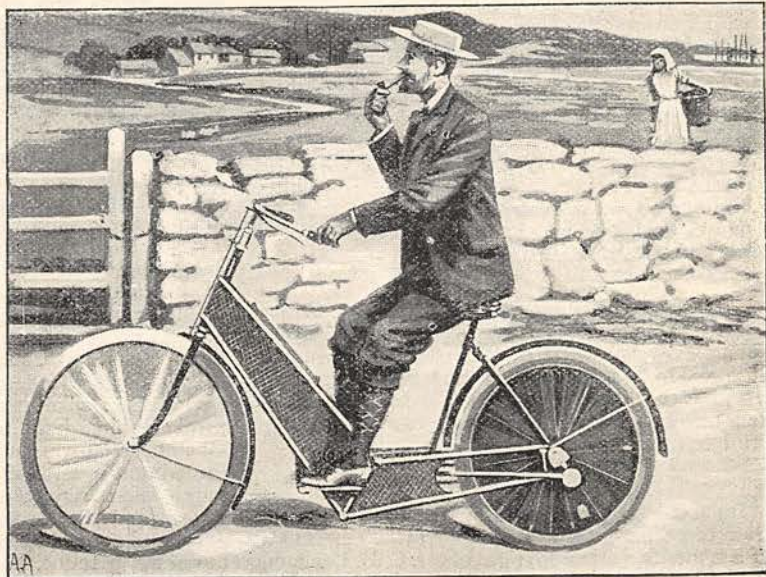
cycles has made its appearance, the indiarubber containing cells or chambers of oval section, and giving elasticity comparable to that of the pneumatic tyre.

**Novelties for the Household.**

A folding tooth-brush is one of the latest conveniences which will be appreciated by all who travel, and especially those to whom space for their impedimenta is a consideration. The ivory handle stops a short distance from the head of the brush, and is there hinged into a metal case, which serves as a protection for the brush when it is not in use, and as a handle when it is open.—Another novelty which is primarily of interest to travellers, but whose interest is far from being confined to them, is to be found in the Tea Tabloids which are now coming into general use. The tabloids are made chemically from compressed tea, and all danger of tannin and other injurious adjuncts to tea-drinking are done away with. The tabloids have just to be dropped into a cup, covered with boiling water, stirred and flavoured to taste by means of milk and sugar, or, preferably, saccharine.—"Mustardyne" is a new condiment which has just been prepared by a well-known firm of mustard manufacturers, and is supplied ready mixed in jars which are fitted with cork stoppers that carry a spoon for serving. It is claimed for this preparation that it preserves its freshness and gives the mustard a delicate flavour of celery which is much appreciated.—Dr. Mackenzie's Arsenical Toilet Soap is a new toilet preparation which is being highly recommended by many authorities for its excellent effect upon the skin and complexion.

**Wire Engravings.**

Making pictures according to a design by means of fine flexible wires bent on the fingers, and mounted on wood marked with grooves, is evidently



A GASOLINE BICYCLE.



finding its way westward from Japan. The figures thus made resemble outline drawings in ink, and consist of book ornaments, landscapes, and portraits.

#### A Line-Drawer.

The ordinary line-drawer is troublesome because of the ink drying in the nib and the necessity of

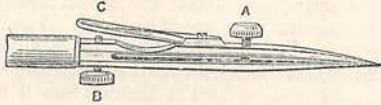


FIG. 1.

adjusting it by screw in passing from a fine to a thick line, or *vice versa*. These drawbacks are overcome in the pen shown in Fig. 1. The upper jaw is flexible at its root, and has a tongue, C, on which the pressure of the finger adjusts the points, which are fixed by the screw, A. The other screw, B, enables the width of a thick line to be kept by serving as a prop to the tongue, C. Another tool for draughtsmen is the erasing stencil shown in Fig. 2. It is made of celluloid  $\frac{1}{16}$  inch thick, and has a narrow slot S, with thin edges, which is placed on the blot or lines to be rubbed out. The slot keeps the eraser in its place. The stencil can be used with a T-square, as a straight-edge, by means of the knob, K, and its translucency is another advantage to the artist.

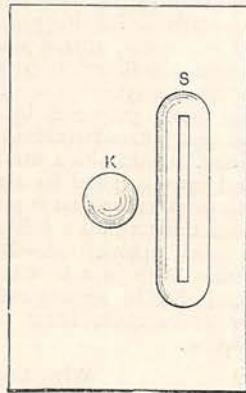


FIG. 2.

#### Abraham Lincoln.

The story of President Lincoln's faithful life and tragic death has often been told, and it is one that is ever new. Messrs. G. P. Putnam's Sons send us a new edition of the volume of the "Heroes of the Nations" Series, in which Mr. Noah Brooks gives a brief and brightly-written biography of "the Lawyer President." The volume is one that will be read with interest on both sides of the Atlantic, for it epitomises the story of the downfall of slavery with considerable effect.

#### A Fountain Tree.

A tree which yields a supply of water when the bark is cut has been discovered in Madagascar. It is said to be a congener of the "milk" or "cow" tree, but the liquid in this case is both colourless and tasteless like water, and affords a refreshing drink to travellers.

#### A Spectrum Top.

It should be mentioned that the artificial spectrum top, which was described in THE GATHERER of last month, is the copyright of Mr. C. E. Benham, of Colchester, from whom further particulars can be obtained.

#### Prize Competitions.

Intending competitors for the prizes offered in our December and January numbers are reminded that March 1st is the latest date for receiving entries in the Puzzle Competition, and that the Cookery Competition closes on the 3rd April. Full particulars of each Competition were given with the announcements.

## GARDENING IN FEBRUARY.

**F**EBRUARY is a month of the earliest flowers. The snow-bells of the *Galanthus* peep up through the brown earth towards the latter end of the month, and the Winter Aconite in its quaint collar of green leaves gives a glimmer of brilliant yellow. One of the prettiest winter pictures we have seen was composed of the deep crimson leafless stems of the Siberian dogwood, the surface of the soil coated with aconite—a rich association of colouring.

The greenhouse should now be full of gay flowers—tulips, hyacinths, scillas, and the many other delightful things we have recommended. Always keep the soil in their pots fairly moist, and put a neat stick to each hyacinth spike, not, however, to be obtrusive.

As mentioned last month, dig up vacant ground, and renew faulty lawns. In the course of a week one receives a shoal of letters asking for advice about mossy, lichen-covered lawns. The reason they get into this condition is partly through extreme neglect and partly through insufficient drainage; and without thorough drainage one cannot get a soft velvety pile carpet of Nature's own handicraft, a carpet to delight the eye of an ardent tennis-player. If mossy, lift the whole lawn, dig out the surface to a depth of six inches, and put in, say, three inches of rubble, cinder ashes, etc. Over this place some good turves as cut. They need not be stacked, as many suppose is necessary.

One must now think of the seeds to be sown the next and following month. A few simple things you must have like Sweet Peas, *Nasturtiums*, especially a variety named *Vesuvius*. *Convolvulus* and the lovely Canary Creeper will give much pleasure through the summer months.

If Cabbages seem eaten, dust about them with lime, and sow such things as Carrots, Onions, and Lettuce on the warmest border in the garden. If you wish for very early potatoes, make a planting of them on a warm border. Strawberries may be planted now, selecting the most plump crowns, and get rid of all pruning. At this season greenhouse pests are troublesome, but tobacco smoke in mild doses will destroy these small marauders.

Owners of small gardens are often without some precious things because their existence is unknown. One of the most beautiful and uncommon Ivies in the winter months is *Hedera atro-purpurea*, the purple-leaved ivy, the plant being very quick in growth and the leaves of a lovely deep brown-purple colour. Planted against the winter flowering *Jasmine*, the effect is unique: intense yellow flowers against purple, almost chocolate leaves.